

Practice: 516 - Livestock Pipeline**Scenario: #1 - Above Ground Pipeline****Scenario Description:**

An above ground plastic pipeline is installed to convey water from a source of supply to points of use for livestock in a prescribed grazing system or wildlife for temporary watering locations.

Before Situation:

Livestock have an inadequate or unacceptable water supply which can lead to compromised animal health. Water can be supplied from a central source(s) by piping to one or more locations in the pasture. Water locations are temporary and occur during non-freezing times of the year.

After Situation:

An above ground plastic pipeline is installed to convey water from a water source to point of use for temporary watering. Payment incorporates pipe and quick connect coupler and fittings. The pipeline is installed as a facilitating practice for supplying water in a managed grazing system, to reduce soil erosion, improve water quality, improve health and vigor of key forage plant species and improve or maintain animal health. The pipeline is to be protected from UV radiation damage, as well as damage from vehicles, animals, people, and fire. The landowner is responsible for repair or replacement of the pipeline as necessary under O&M during the specified life span of the practice. Cost data is applicable to organic and conventional agricultural production systems. Associated practices include Fencing (382), Prescribed Grazing (528), Animal Trails and Walkways (575), Access Control (472), Pumping Plant (533), Water Well (642), Heavy Use Area (561) and Watering Facility (614).

Scenario Feature Measure: Foot

Scenario Unit: Linear Foot

Scenario Typical Size: 2,000

Scenario Cost: \$3,395.70

Scenario Cost/Unit: \$1.70

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$22.43	10	\$224.30
Materials						
Pipe, HDPE, smooth wall, weight priced	1379	High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only.	Pound	\$3.53	878	\$3,099.34
Mobilization						
Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$72.06	1	\$72.06

Practice: 516 - Livestock Pipeline**Scenario: #2 - Buried Pipeline, < 2in Plastic****Scenario Description:**

Installation of a plastic pipeline, less than 2" diameter, to convey water from a source of supply to points of use for livestock in a prescribed grazing system or for wildlife. Installation is by trenching, or by backhoe across a stream or other locations where installation of the pipeline by trenching is not feasible.

Before Situation:

Livestock have an inadequate or unacceptable water supply which can lead to compromised animal health. Water can be supplied from a central source(s) by piping to one or more locations in the pasture. Soil conditions are suitable for pipe installation without bedding.

After Situation:

A 1½ inch diameter, Schedule 40 PVC plastic pipeline for stockwatering, 4165 ft long is installed for supplying water in a managed grazing system, to reduce soil erosion, improve water quality, improve health and vigor of key forage plant species and improve or maintain animal health. Payment includes couplers and fittings. Cost represents typical situations for conventional, organic, and transitioning to organic producers. Associated practices include Fencing (382), Prescribed Grazing (528), Animal Trails and Walkways (575), Access Control (472), Pumping Plant (533), Water Well (642), Heavy Use Area (561) and Watering Facility (614).

Scenario Feature Measure: Foot**Scenario Unit:** Linear Foot**Scenario Typical Size:** 4,165**Scenario Cost:** \$10,256.14**Scenario Cost/Unit:** \$2.46**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$56.68	12	\$680.16
Trencher, 8"	936	Equipment and power unit costs. Labor not included.	Hour	\$90.99	34	\$3,093.66
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$27.84	9	\$250.56
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$22.43	42	\$942.06
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$22.06	34	\$750.04
Materials						
Pipe, PVC, 1 ½", SCH 40	975	Materials: - 1 1/2" - PVC - SCH 40 - ASTM D1785	Foot	\$1.01	4165	\$4,206.65
Mobilization						
Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$72.06	1	\$72.06
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$260.95	1	\$260.95

Practice: 516 - Livestock Pipeline**Scenario: #3 - Buried Pipeline, 2in - 3in Plastic****Scenario Description:**

Installation of a 2" - 3" diameter plastic pipeline to convey water from a source of supply to points of use for livestock in a prescribed grazing system or for wildlife. Installation is by trenching, or by backhoe across a stream or other locations where installation of the pipeline by trenching is not feasible.

Before Situation:

Livestock have an inadequate or unacceptable water supply which can lead to compromised animal health. Water can be supplied from a central source(s) by piping to one or more locations in the pasture. Soil conditions are suitable for pipe installation without bedding.

After Situation:

A 2½ inch diameter, Schedule 40 PVC plastic pipeline for stockwatering, 3300 ft long is installed for supplying water in a managed grazing system, to reduce soil erosion, improve water quality, improve health and vigor of key forage plant species and improve or maintain animal health. Payment includes couplers and fittings. Cost represents typical situations for conventional, organic, and transitioning to organic producers. Associated practices include Fencing (382), Prescribed Grazing (528), Animal Trails and Walkways (575), Access Control (472), Pumping Plant (533), Water Well (642), Heavy Use Area (561) and Watering Facility (614).

Scenario Feature Measure: Foot**Scenario Unit:** Linear Foot**Scenario Typical Size:** 3,300**Scenario Cost:** \$10,466.33**Scenario Cost/Unit:** \$3.17**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$56.68	12	\$680.16
Trencher, 8"	936	Equipment and power unit costs. Labor not included.	Hour	\$90.99	25	\$2,274.75
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$22.43	33	\$740.19
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$22.06	25	\$551.50
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$27.84	12	\$334.08
Materials						
Pipe, PVC, dia. < 18", weight priced	1323	Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only.	Pound	\$1.44	3856	\$5,552.64
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$260.95	1	\$260.95
Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$72.06	1	\$72.06

Practice: 516 - Livestock Pipeline**Scenario: #4 - Buried Pipeline, >3in****Scenario Description:**

Installation of a large diameter plastic pipeline to convey livestock water from a spring development to a watering facility to service a prescribed grazing system.

Before Situation:

Livestock have an inadequate or unacceptable water supply which can lead to compromised animal health. Water can be supplied from a central source such as a spring by piping to a watering facility. Soil conditions are suitable for pipe installation without bedding.

After Situation:

A delivery pipe (typically 4" diameter, Schedule 40 PVC Plastic) from a spring development to a watering facility, or from water source to watering facility for gravity flow systems. The pipeline is installed as a facilitating practice for supplying water in a managed grazing system, to reduce soil erosion, improve water quality, improve health and vigor of key forage plant species and improve or maintain animal health. Payment incorporates couplers and fittings. Cost represents typical situations for conventional, organic, and transitioning to organic producers. Associated practices include Fencing (382), Prescribed Grazing (528), Animal Trails and Walkways (575), Access Control (472), Pumping Plant (533), Water Well (642), Heavy Use Area (561) and Watering Facility (614).

Scenario Feature Measure: Foot

Scenario Unit: Linear Foot

Scenario Typical Size: 800

Scenario Cost: \$4,468.87

Scenario Cost/Unit: \$5.59

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Trenching, Earth, 12" x 60"	1459	Trenching, earth, 12" wide x 60" depth, includes equipment and labor for trenching, laying 3"-6" CPP drain line with envelope, and backfilling.	Foot	\$1.90	800	\$1,520.00
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$22.43	8	\$179.44
Materials						
Pipe, PVC, dia. < 18", weight priced	1323	Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only.	Pound	\$1.44	1742	\$2,508.48
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$260.95	1	\$260.95

Practice: 516 - Livestock Pipeline**Scenario: #5 - Bedded Pipeline****Scenario Description:**

Installation of a gravel-bedded plastic pipeline in locations or conditions where the gravel bedding is necessary component of pipeline installation due to shallow bedrock, excessively rocky or otherwise unfavorable soil conditions so that the pipeline is evenly supported and protected from damage throughout the length of the trench. The purpose of the pipeline installation is to convey water from a water supply source to points of use for livestock in a prescribed grazing system or wildlife.

Before Situation:

Livestock have an inadequate or unacceptable water supply which can lead to compromised animal health. Water can be supplied from a central source(s) by piping to one or more locations in the pasture. Soil conditions (excessively stoney soil, unstable soil or frequent crossing by heavy equipment) requires the pipe to be protected by gravel backfill.

After Situation:

1600 feet of Schedule 40 PVC plastic pipeline (800' of 1 1/2" diameter, and 800' of 2 1/2" diameter) is installed in gravel bedding in pastureland as part of a livestock water delivery system. The pipeline is installed as a facilitating practice for supplying water in a managed grazing system, to reduce soil erosion, improve water quality, improve health and vigor of key forage plant species and improve or maintain animal health. Cost represents typical situations for conventional, organic, and transitioning to organic producers. Associated practices include Fencing (382), Prescribed Grazing (528), Animal Trails and Walkways (575), Access Control (472), Pumping Plant (533), Water Well (642), Heavy Use Area (561) and Watering Facility (614).

Scenario Feature Measure: Foot**Scenario Unit:** Linear Foot**Scenario Typical Size:** 1,600**Scenario Cost:** \$6,268.61**Scenario Cost/Unit:** \$3.92**Cost Details (by category):**

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$56.68	24	\$1,360.32
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$22.43	16	\$358.88
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$27.84	24	\$668.16
Materials						
Pipe, PVC, dia. < 18", weight priced	1323	Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only.	Pound	\$1.44	935	\$1,346.40
Pipe, PVC, 1 1/2", SCH 40	975	Materials: - 1 1/2" - PVC - SCH 40 - ASTM D1785	Foot	\$1.01	800	\$808.00
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	\$24.72	59.3	\$1,465.90
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$260.95	1	\$260.95

Practice: 516 - Livestock Pipeline**Scenario: #6 - Cased Pipeline with Boring****Scenario Description:**

Installation of a 2"- 3" plastic pipeline within an outer casing, bored under a road or other obstruction to convey water from a source of supply to points of use for livestock in a prescribed grazing system or wildlife.

Before Situation:

Livestock have an inadequate or unacceptable water supply which can lead to compromised animal health. Water can be supplied from a central source(s) by piping to one or more locations in the pasture. Soil conditions or location require boring to facilitate pipe installation.

After Situation:

The typical installation consists of installing 60 feet of a 2.5 inch, Schedule 40 PVC plastic pipe with a 4 inch outer casing under a roadbed. Pipeline boring includes all pipe under roadbed and labor and equipment involved during installation of pipe. The pipeline is installed as a facilitating practice for supplying water in a managed grazing system, to reduce soil erosion, improve water quality, improve health and vigor of key forage plant species and improve or maintain animal health. Payment incorporates couplers and fittings. Cost represents typical situations for conventional, organic, and transitioning to organic producers. Associated practices include Fencing (382), Prescribed Grazing (528), Animal Trails and Walkways (575), Access Control (472), Pumping Plant (533), Water Well (642), Heavy Use Area (561) and Watering Facility (614).

Scenario Feature Measure: Foot

Scenario Unit: Linear Foot

Scenario Typical Size: 60

Scenario Cost: \$4,409.08

Scenario Cost/Unit: \$73.48

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Horizontal Boring, > 3" diameter	1132	Includes equipment, labor and setup.	Foot	\$53.41	60	\$3,204.60
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$56.68	1	\$56.68
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$22.43	2	\$44.86
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$27.84	1	\$27.84
Materials						
Pipe, PVC, dia. < 18", weight priced	1323	Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only.	Pound	\$1.44	70	\$100.80
Pipe, PE, 4", DR 9	1002	Materials: - 4" - PE - 160 psi - ASTM D3035 DR 9	Foot	\$7.54	60	\$452.40
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$260.95	2	\$521.90